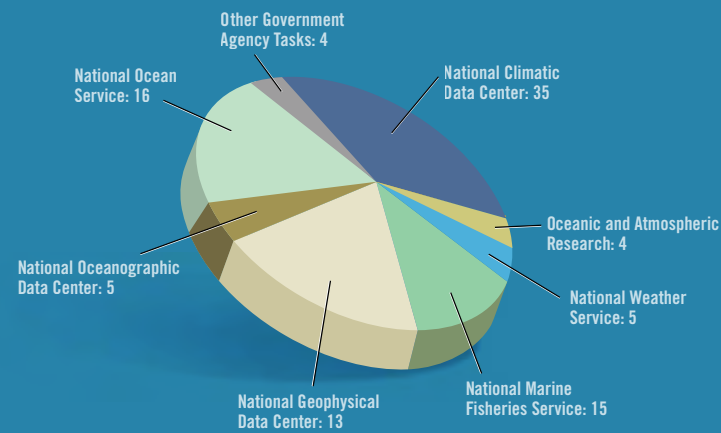




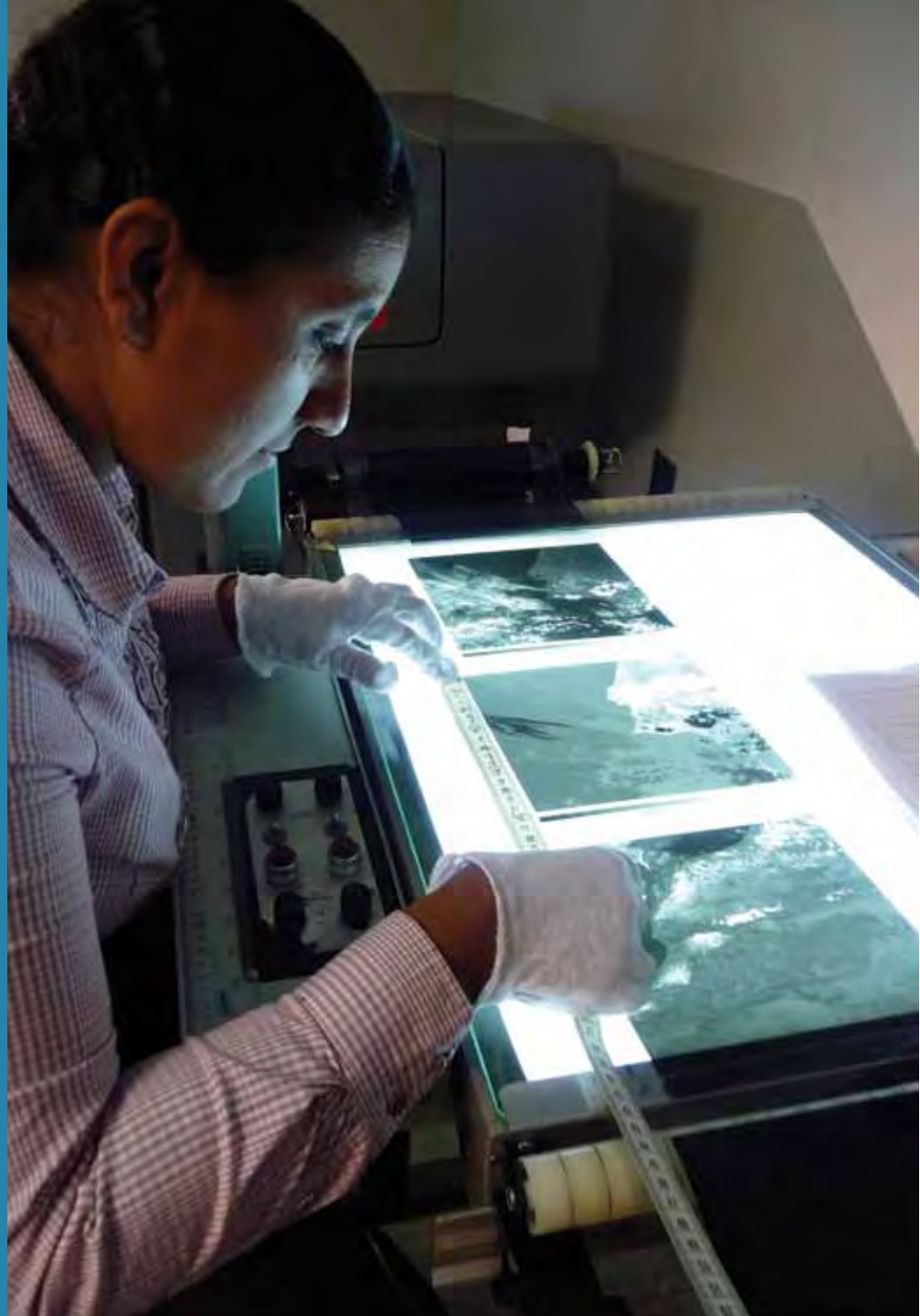
CLIMATE DATABASE MODERNIZATION PROGRAM

National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service
National Climatic Data Center
Asheville, North Carolina

The year 2010 marked the beginning of the Climate Database Modernization Program's second decade of service. CDMP continues to support every NOAA line office by preserving and enhancing the availability of valuable climate and environmental data. These data are used by researchers and others dealing with climate and environmental issues crucial to our planet and our global society.



FY10 TASK BY NOAA ORGANIZATION
Total Number of NOAA CDMP projects reached 97 in 2010



CDMP: A New Decade of Achievement Begins

The National Oceanic and Atmospheric Administration's Climate Database Modernization Program (NOAA's CDMP) just completed its eleventh year. When the program began in 2000, the demand for rapid and complete access to the Nation's and world's climate data by researchers and global change scientists was a key motivation in the establishment of CDMP, which is managed through NOAA's National Climatic Data Center (NCDC) located in Asheville, NC. Congress initiated the program to assist NOAA in modernizing and improving access to the Nation's climate data and information.

As CDMP enters its second decade, that demand for climate data access has, if anything, increased. In addition, CDMP has expanded its support across all of NOAA, preserving and making available environmental data ranging from the ocean floor to the top of the ionosphere. Partnering with four private sector contractors, CDMP has placed online over 57 million images and some 14 terabytes of weather and environmental data, all available to researchers around the world via the Internet. Major progress continues in making these data available through a number of NOAA web sites (see URL list on inside back cover). In addition, hourly weather records keyed through CDMP continue to be integrated into NCDC's digital database holdings, extending the period of record for many stations back into the 1800s. The increase in the quality and quantity of historical data helps researchers worldwide to improve real-time monitoring and forecasting of environmental, solar and geophysical events.

Special care is provided to these fragile film negatives by a CDMP contractor. CDMP has scanned over 57 million images in its eleven-year history.



CDMP began scanning bird phenology and migration cards in 2010, which can actually provide information on climate change (see accompanying DVD).

MAJOR CDMP TASKS FOR 2010

National Climatic Data Center

Hourly Surface Observations: imaging, keying
Daily Cooperative Observations: imaging, keying
Upper-Air Observations: imaging, keying
Signal Service/Smithsonian Obs ("Forts"): keying
Historic Marine Observations: keying
Mexican Daily/Hourly Data: imaging, keying
Vietnamese Hourly Data: keying
Snotel Data: keying
East India Company Data: keying
Navajo Nation Data: keying
Bird Phenology & Migration Cards: imaging
Station History & Metadata Development
Integrated Inventory System Development
Subscription Services

National Geophysical Data Center

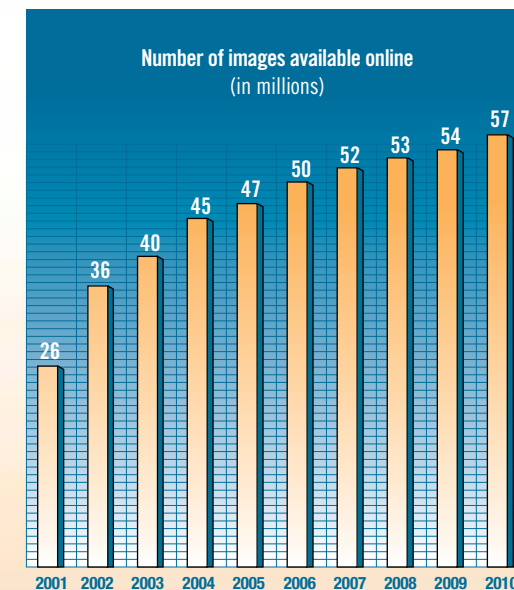
DMSP Film: imaging
Glacier Photos: imaging
Marine Geophysical Records: imaging, keying
Ionospheric Observations: keying
Historical Solar and Spectral Observations: imaging
Tsunami Event Gauge Records: imaging, keying
Historic International Polar Year: imaging
Marine/Lacustrine Record of Climate Change: imaging
Heat Mapping Mission Data: imaging
Historic Cosmic Ray Ionization Chamber Data
Historical International Polar Year: imaging

Supporting NOAA's Stewardship Commitment

The Climate Database Modernization Program supports NOAA's mission to collect, integrate, assimilate and effectively manage Earth observations on a global scale, ranging from atmospheric, weather, and climate observations to oceanic, coastal, and marine life observations, to data collected from outer space. Many of these holdings, which are part of the U.S. National Archives, were originally recorded on paper, film, and other fragile media, and stored at various NOAA Centers. Prior to CDMP, not only were these valuable data sources mostly unavailable to the scientific community, but storage technology for the archives was not state-

of-the-art. Without proper preservation of the media, the information they contained was in danger of being lost forever.

Now in its second decade, CDMP has greatly improved the preservation and access to NOAA's holdings by migrating many of these resources to new digital media. Digital images of many of the holdings are now available online. In addition, millions of historic data records have been key-entered by data entry specialists into computer-friendly text files, with the keyed data integrated into numerous digital databases. CDMP projects span the full spectrum of NOAA, supporting all five line offices. CDMP also works with U.S. regional climate centers, state climatologists, the U.S. Air Force, the World Meteorological Organization, and foreign meteorological services in Europe, Africa, Asia, and the Americas. These NOAA efforts benefit researchers and data users throughout the Nation and worldwide. The increase in data accessibility and the inclusion of these historical data sets into the integrated global databases needed by today's climate and environmental data users support the CDMP mission: to make major climate and environmental databases available via the World Wide Web.



U.S. Regional Climate Centers

Database Conversion and Quality Control

National Oceanographic Data Center

NOAA Library Rare Climate Publications: imaging
Oceanographic Metadata Archeology Project: imaging, keying
NOAA Film transfer: Beta/VHS to digital

National Weather Service

African Upper-Air Observations (7 nations): keying
Surface Data from Uruguay: imaging, keying
Tropical cyclone "storm wallets": imaging

National Ocean Service

Shoreline Charts: vectorizing
Thunder Bay Historical Collections: imaging, keying
Historical Maps and Nautical Charts: imaging, geolocation
Historic Environmental Sensitivity Maps: imaging
Fish Commission Historical Papers/Logbooks: imaging, keying
High/Low Water Level at NOS Sites: imaging, indexing, keying
Special Reports for Geographic Names: imaging
Historical Aerial Photography: imaging
California Marine Ecosystem Survey: imaging, keying

National Marine Fisheries Service

Data Recovery on Cetaceans: imaging, keying
REEF: optical scanning
Historical Menhaden Tagging Data: keying
Historic Fish Landing Data: keying
Historical Plankton Data Rescue: keying
Historical Alaskan Groundfish & Bering Sea Crab Data: keying
Historical Fisheries Data Rescue in the Northeast U.S.: imaging, keying, audio conversion
CalCofi Fish Larval Data Rescue: keying
West Coast/Alaskan Plankton Data Recovery: keying
Turtle Exclusion Data: imaging and keying
Hawaiian Humpback Whale Sighting Data: imaging, database
Seal/Cetacean Slide Conversion: imaging
Oral History Interviews: transcription and digitizing

Office of Oceanic and Atmospheric Research

Hurricane Reconnaissance: imaging, streaming video
European Historical Ship Logbooks: imaging, keying
San Cristobal, Galapagos Islands Surface Data: imaging, keying



CDMP PROJECTS HAVE CREATED SCORES OF NEW PRIVATE SECTOR DATA ENTRY/INFORMATION MANAGEMENT JOBS IN SEVERAL ECONOMICALLY CHALLENGED AREAS IN WEST VIRGINIA, KENTUCKY AND MARYLAND.

NOAA's CDMP Project Partners

The CDMP could not exist without the extraordinary efforts of people within NOAA and those in the private sector who do the keying, imaging, and database development. CDMP projects have created hundreds of new private sector data entry and information management jobs in several economically challenged areas in West Virginia, Kentucky, and Maryland. The project tasks supported by CDMP are well suited for the private sector. Many of these tasks have been shifted from

government employees to CDMP contractors in the above mentioned states. Tasks performed by these contractors include the printing and distributing of the NCDC serial climate publications, managing accounts receivable, imaging and keying incoming records, hosting and maintaining online images, and providing expert personnel in support of various projects.

The three prime contractors for CDMP are NISC (an IBM Company), Rocket Center, West Virginia; SourceCorp, Mount Vernon,

Kentucky; and HOV Services, Beltsville, Maryland. Excellent support is also provided by the NCDC on-site contractor, STG Corporation, whose staff prepares many of the data for shipment and performs extensive quality control on the returning data products. With nearly 100 projects ongoing, the contractors must remain focused and flexible to meet each project's requirements.

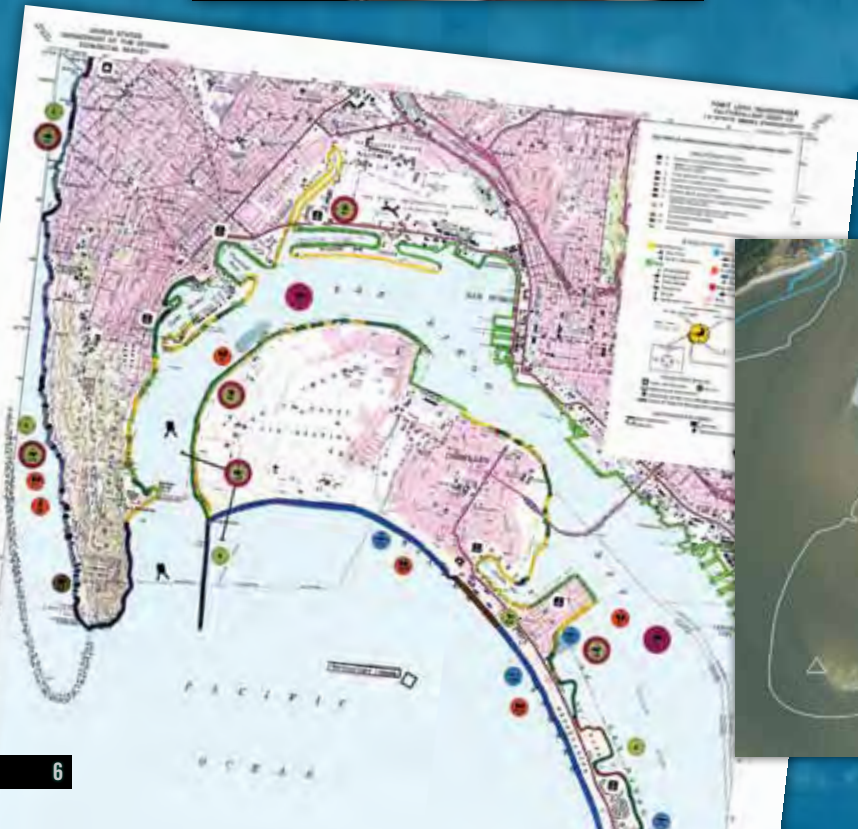


CDMP: Providing New Views of a Changing Shoreline



So you’ve been to the beach a few times, maybe even more. It looks about the same as it always has, right? Surprise: it’s probably changed more than you think.

Our Nation’s shoreline has actually changed dramatically – and sometimes suddenly – over the decades. But quantifying these changes has traditionally been an arduous task of manually comparing shoreline maps or aerial photographs from different eras – that is, if these are even available, not a given considering the age of and limited access to many of these historic surveys. But that’s all changing, thanks to CDMP-supported projects which are bringing historic shoreline maps and photos to light.



The Shoreline Vectorization Project digitizes coastal maps, illustrating shoreline change over time. For example, a portion of the South Carolina shoreline near Hilton Head has eroded close to 700 meters since 1934, as shown in the composite below.



As part of the Shoreline Vectorization Project, conducted under the joint auspices of NOAA’s Coastal Services Center and National Geodetic Survey, historic shoreline maps are being brought into the digital age. These maps, or “T-sheets,” are first scanned into digital images. Next, CDMP-contracted geographic information system specialists “georeference” certain map points; that is, the locations are “pinned” to a spot for which precise global coordinates are known. As this process is repeated for numerous T-sheets, a robust digital dataset is emerging for the entire coastline.

But as we mentioned, the shoreline is changing all the time. Thus, T-sheets are georeferenced for the same coastal areas from surveys made in different eras. This enables researchers to easily overlay digitized maps from different periods, with the resulting shoreline changes practically jumping off the computer screen.

The applications of these digitized shoreline maps are almost dizzying in scope. Groups such as the U.S. Army Corps of Engineers and the U.S. Geological Survey have used the data to perform shoreline management and coastal erosion studies. Impacts from catastrophic events, such as landfalling hurricanes, can also be studied. Indeed, CDMP-produced shoreline data have already been used to hunt for geological traces of one such event – a devastating tsunami that struck Puerto Rico nearly a century ago.

On October 18, 1918, Puerto Rico was struck by a magnitude 7.5 earthquake. Tsunami waves as high as 20 feet generated by the quake crashed into the west coast of the island, killing 40 and causing millions of dollars of damage. Using CDMP-digitized

“before and after” T-sheets of the island, U.S. Geological Survey scientists were able to clearly define the effects of the tsunami on the Puerto Rican coastline.

But it’s not just historic maps that are being digitized through CDMP. A once-lost collection of rare “multi-lens” aerial shoreline photography is also being scanned, with spectacular results.

From the 1920s through the ‘60s, planes equipped with special multi-camera equipment flew over much of the Nation’s coastline, snapping high-resolution photographs. But these multi-lens photos were lost in storage for decades. Recently, they were rediscovered by NOAA’s National Geophysical Data Center (NGDC). Working with CDMP contractors, NGDC has begun to sort and index the scores of bundles of photographs, and the first batches of the photographs have been imaged with breathtaking detail.

Already, these recovery efforts are paying off. NGDC provided images of the eastern Florida coastline, originally photographed in 1928, upon a request from the Brevard County, FL Historical Commission. In a letter to CDMP, Commission archivists reported that the “positive effects” of the photographs were “overwhelming,” and that researchers have “utilized the photos to answer... questions that had been asked for decades” about how the Florida coastline has changed over that time.

NGDC has prototyped an online retrieval system for the images. As more scans are added over the upcoming years through CDMP, this new dataset will be available to help other researchers all across the country.

Unique multi-lens aerial photographs, lost for decades, are now being recovered and scanned into modern digital images thanks to CDMP.



Securing a “Win-Win” for Renewable Energy and the Environment



Historic fishing records from California, recovered through CDMP, help establish how fish habitats have changed over decades.

In the video version of this report, included on the accompanying DVD, you can see and hear how CDMP is helping to recover historic fishing records from the California coast. These data are being used to fill critical gaps in the history of West Coast fish habitats.

But these records are not just important for past trends. They are also being used to help protect commercial fishing habitats and sensitive marine life of today. At the same time, they may help pave the way for an exciting possible new source of renewable energy, generated using one of the more reliable sources on Earth: the ocean's waves.

In 2010, a preliminary permit was issued to study the feasibility and impacts of the Central Coast WaveConnect™ Project, a proposed ocean wave energy project to be located off the coast of California's Santa Barbara County. Pacific Gas & Electric has been granted up to three years to study the offshore environment in the area to determine whether the location is appropriate for this new energy facility, which could become a major contributor to the supply of sustainable, renewable energy in California.

Participating in the public notice period for the granting of this preliminary permit, NOAA's National Marine Fisheries Service commented on the potential impacts of the facility. Using historical fishing records recovered through CDMP to boost the depth and reliability of existing data, the Fisheries Service demonstrated that an assessment was needed to determine possible impacts on the marine ecosystem in the proposed project region. It was agreed that part of the three-year study would attempt to determine if any protected marine mammal or fish species are in the region and if they would be adversely affected, as well as any potential effects on commercial fishing habitats in the area. This includes several historical habitats, identified through CDMP-recovered data, which may otherwise have been missed. So thanks in part to CDMP, a “win-win” was secured for Santa Barbara County. The first steps toward a potentially valuable, sustainable energy source are now underway, while the interests of local fishermen and the Central Coast's marine environment are being considered and protected.

CDMP Supports Response to Gulf Oil Spill

Following the tragic Deepwater Horizon explosion and subsequent Gulf of Mexico oil spill in April 2010, responders turned to CDMP-produced resources to help mitigate the disaster.

Immediately after the spill, NOAA scientists pulled up digital versions of Environmental Sensitivity Index (ESI) maps, imaged by CDMP just the year before. These ESI maps were used by responders to help identify areas potentially at risk from the spill, including biological resources (such as birds and shellfish beds), sensitive shorelines (such as marshes and tidal flats), and human-use resources (such as public beaches and parks). The easy access to these newly digitized maps saved invaluable time and resources. Find out more about this CDMP contribution in the accompanying DVD video report.

Meanwhile, a staggering 37 gigabytes of shoreline data covering a 140 year span (1848-1988) were provided to the Louisiana Department of Transportation. These were used as part of a post-Deepwater task with local and NOAA scientists

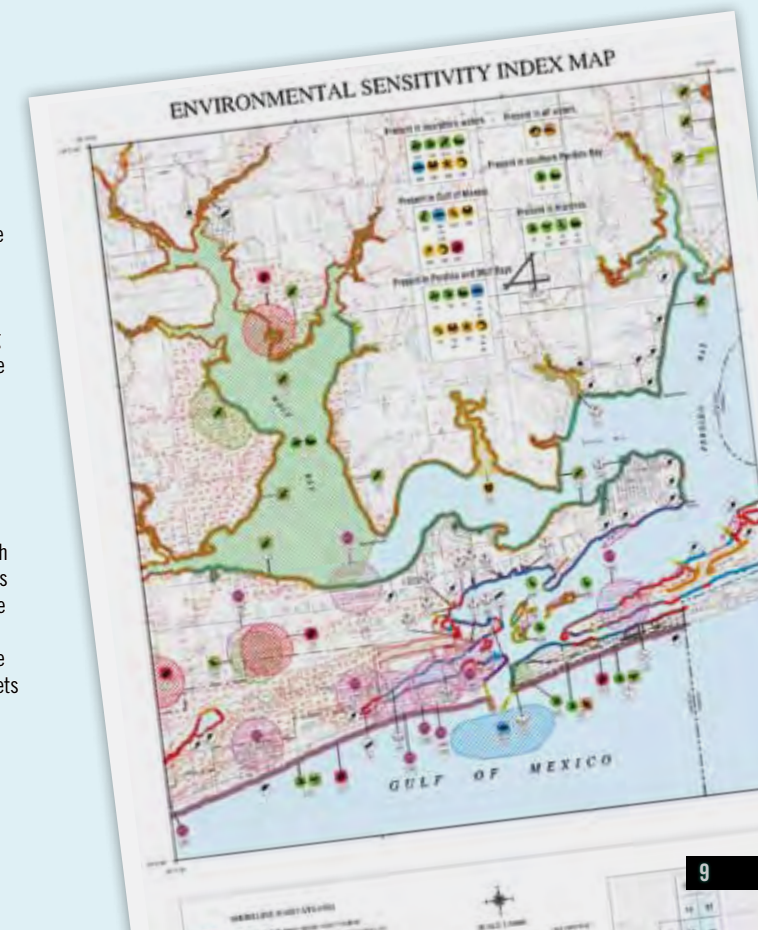
NOAA scientist Jill Petersen refers to a paper Environmental Sensitivity Index (ESI) map; these large format maps are now available online through CDMP.

to determine a coastline measurement, and to help them define precisely what constitutes a coastline/shoreline, a topical post-spill issue. The data provided consisted of 324 descriptive reports, 423 original map scans, and 385 georeferenced T-sheets of the Gulf coastline (see page 6 for more on the Shoreline Vectorization project).

Digitized ESI maps (right) became a critical tool in NOAA's response to the Deepwater Horizon disaster in the Gulf.

Over 150 video files related to past oil spills were added to the NOAA Central Library website as part of their efforts to support the NOAA-wide response to the spill. The videos had been converted from VHS and Betacam videotape to digital movie files as part of a joint venture of the National Oceanographic Data Center and CDMP. As they were placed online, these videos became instantly available to scientists in the field, and to anyone in the world seeking more information about oil spills and restoration efforts.

The quick access to these state-of-the-art digital products vividly demonstrates the value of CDMP's wide-ranging modernization efforts. In short, CDMP is saving so much more than data.





The first Television Infrared Observation Satellite (TIROS I) was launched 50 years ago, in April, 1960. CDMP has teamed with NOAA's Central Library to produce a special web site honoring the anniversary.

CDMP Helps Celebrate 50 Years of Satellite Meteorology

The year 2010 marked the 50th anniversary of the first weather satellite, TIROS I, launched in 1960. It is impossible to overstate the impact that weather satellites have had in the sciences of meteorology and climatology. From hurricanes to blizzards, sea-surface temperatures to atmospheric water vapor, volcanic eruptions to polar ice coverage, satellite imagery has transformed how we look at, and are able to analyze, our physical world.

To help mark the this historic occasion, the NOAA Central Library, with support of CDMP, has placed online hundreds of historic text documents, photographs, and videos from the early satellite age. Visit the Library's TIROS website (address on back page) for access to these resources; meanwhile, here are some of the more fascinating and pioneering images from that time, courtesy of the NOAA Library and CDMP.



Images from the TIROS satellites provided groundbreaking information to meteorologists. A meteorologist (lower left) analyzes a weather map directly on a satellite image; the results of his work (above); severe thunderstorms in the plains seen for the first time from space (lower right).



TIROS III image of Hurricane Anna in 1961, the first hurricane detected by satellite.

CDMP Around The Globe

MADAGASCAR



East India Company Logbooks Reveal Indian Ocean Tropical Cyclone Encounter in 1827: On a return voyage from Whampoa, China, to England, there is strong evidence that the Lady Melville of the English East India Company encountered a tropical cyclone in the Southern Indian Ocean off the coast of Madagascar in April, 1827. The Lady Melville's misfortune was revealed by ship observations recently keyed through CDMP.

Saturday 21st April 1827
First burst a strong Gale middle Water
increasing to a perfect Hurricane, with
a many Sea ship labouring much.

TANZANIA



Data from Tanzania keyed: CDMP continues to receive African "pilot balloon" (pibal winds and temperature) upper-air data in cooperation with the Tanzania Meteorological Agency. These data from the 1960s and 1970s have then been keyed for three of the thirteen pibal stations in Tanzania. The digitized data will be incorporated into NOAA's Integrated Global Radiosonde Archive database, filling gaps and holes in a data-sparse region, and leading to better analysis of upper air trends and patterns.

ALASKA



Historic Alaska Observations Added to Database: Daily weather data from several historic Alaskan stations, dating back to the 1860s, were keyed as part of the CDMP "Forts" project. Five weather stations, with data periods ranging from the 1860s to the 1890s, were identified and keyed. The longest complete period of daily data was for Sitka, AK, from 1867-1877. This set dovetails with prior records from Sitka uncovered by NOAA's Pacific Marine Environmental Laboratory. This is a very valuable find for climate scientists, as observations from data-sparse polar regions during this period are rare.

Barometer	Therm.	Wind	Clouds	Remarks
29.53	29.62	29.65	...	...
29.62	29.62	29.52	...	...
29.31	29.55	29.62	1, 70	...
29.73	29.76	29.72	...	...
29.63	29.61	29.98	...	...
29.40	29.40	29.41	...	...
29.48	29.53	29.57	...	...
29.58	29.69	29.70	...	...
29.58	29.90	29.85	...	...
29.79	29.76	29.66	...	...
29.58	29.54	29.54	...	...

Web Addresses for NOAA Organizations

Climate Database Modernization Program (CDMP)

www.ncdc.noaa.gov/cdmp.html

National Oceanic and Atmospheric Administration (NOAA)

www.noaa.gov

NOAA's National Environmental Satellite, Data, and Information Service (NESDIS)

www.nesdis.noaa.gov

NOAA's National Climatic Data Center (NCDC)

www.ncdc.noaa.gov

NOAA's National Geophysical Data Center (NGDC)

www.ngdc.noaa.gov

NOAA's National Oceanographic Data Center (NODC)

www.nodc.noaa.gov

NOAA's National Ocean Service (NOS)

oceanservice.noaa.gov

NOAA's National Marine Fisheries Service (NMFS)

www.nmfs.noaa.gov

NOAA's National Weather Service (NWS)

www.nws.noaa.gov

NOAA's Office of Oceanic and Atmospheric Research (OAR)

www.oar.noaa.gov

Web Addresses for Selected CDMP Projects

Oceanographic and Meteorological Laboratory's Atlantic Hurricane Research Division

www.aoml.noaa.gov/hrd

National Hurricane Center's "Storm Wallet" Tropical Cyclone Archive

www.nhc.noaa.gov/pastall.shtml#wallet

National Marine Fisheries Service COPEPOD Global Plankton Database

www.st.nmfs.noaa.gov/plankton

Multi-Lens Air Photos Retrieval System (prototype)

www.ngdc.noaa.gov/dmsp/multilens

NOAA Central Library's TIROS & Satellite Meteorology website

www.lib.noaa.gov/collections/TIROS/tiros.html

National Snow and Ice Data Center Glacier Pairs

nsidc.org/data/glacier_photo/repeat_photography.html

National Geodetic Survey's NOAA Shoreline Data Explorer

www.ngs.noaa.gov/newsys_ims/shoreline/index.cfm

